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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/560,381	04/28/2000	Stephen M. Clark	99CR074/KE	3780

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EXAMINER
WILSON, ROBERT W

ART UNIT	PAPER NUMBER
2661	3

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DATE MAILED: 10/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/560,381	CLARK ET AL.	
	Examiner	Art Unit	
	Robert W Wilson	2661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 April 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1.0 The application of Stephen M. Clark et al. for "Synchronization technique for spread spectrum frequency hopped data links and radios using the same" filed 4/28/03. Claims 1-15 are pending. Claims 1-15 were examined.

Drawings

2.0 The drawings in this application are objected to by the Draftsperson as informal. Any drawing corrections requested, but not made in the prior application should be repeated in this application if such changes are still desired. If the drawings were changed and approved during the prosecution of the prior application, a petition may be filed under 37 CFR 1.182 requesting the transfer of such drawings, provided the parent application has been abandoned. However, a copy of the drawings as originally filed must be included in the 37 CFR 1.60 application papers to indicate the original content.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3.0 Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernard Sklar, DIGITAL COMMUNICATIONS Fundamentals and Applications dated 1988.

Referring to **Claim 1**, Sklar teaches: A method of obtaining coarse synchronization in a frequency hopped/direct sequence spread spectrum (FH/DSS) time division multiple access (TDMA) data link network (Fig 10.20 Pg 567), the method comprising:

Tuning a first receiver to a first frequency out of a plurality of frequencies used in the data link network (output of Frequency Hopper per Fig 10.20 Pg 567)

Observing signal strength of signals received on a first frequency during a sample time period to obtain a sample energy pattern (output of Integrator per Fig 10.20 Pg 567)

Determining an expected energy pattern corresponding to a time uncertainty window, the expected energy pattern being based upon a known hopping pattern (The Integrator integrates a time interval or uncertainty time window in which the output is Threshold tested per Fig 10.20 Pg 567)

Comparing the sample energy pattern to a first portion of the expected energy pattern, the first portion of the expected energy pattern corresponding to a first time period within the time uncertainty window (Comparator per Fig 10.20 Pg 567)

Determining whether the first time period is a coarse synchronization candidate as a function of the comparison between the sample energy pattern and the first portion of the expected energy (Search Control per Fig 10.20 Pg 567)

In Addition:

Regarding **Claim 2,** wherein observing signal strength of signals received on the first frequency during the sample time period to obtain the sample energy pattern further comprises: Obtaining a received energy pattern by observing the signal strength of the signals received on the first frequency during the sample time period; comparing the received energy pattern to a threshold; and obtaining the sample energy pattern by eliminating energy components from the received energy pattern which do not exceed the threshold ("eliminating energy components from the received energy pattern which do not exceed the threshold" has a broad meaning. If received signal which is threshold does not meet the threshold testing per Fig 10.20 Pg 567 then it is eliminated and the serial acquisition is repeated until a candidate is found per Para 10.5.1.2 per Pgs 565-568)

Regarding **Claim 3,** wherein the first time period corresponds to a first plurality of time slots used in the data link network and which fall within the time uncertainty window, and wherein determining the expected energy pattern further comprises determining the first portion of the expected energy pattern based upon an expected hopping pattern for the first plurality of time slots (The Integrator per Fig 10.20 Pg 567 utilizes an integration time or uncertainty time window which is based upon search dwell time as well as probability of detection per Para 10.5.1.2 pgs 565-568.)

Regarding **Claim 4,** wherein the sample period has a duration which is substantially equal to the first time period which falls within the time uncertainty window ("substantially" has a broad meaning. The Integrator per Fig 10.20 Pg 567 utilizes an integration time or uncertainty time window which is based upon search dwell time as well as probability of detection per Para

10.5.1.2 pgs 565-568. It is within the level of one skilled in the art to adjust parameters. The integrator time period can be adjusted based upon search dwell time as well as probability of detection per Para 10.5.1.2 pgs 565-568.)

Regarding **Claim 5,** wherein determining whether the first time period is a coarse synchronization candidate further comprises determining whether the sample energy pattern and the first portion of the expected energy pattern are substantially a match ("substantially match" has a broad meaning. The function shown in Figure 10.20 per Pg 567 determines if there is a "substantial match" based threshold which is calculated based upon probability of detection and dwell time per Para 10.5.1.2 pgs 565-568.)

Regarding **Claim 6,** and if the first time period is determined to not be a coarse synchronization candidate ("Coarse synchronization" has a broad meaning. The Frequency Hopper per Fig 10.20 per Pg 567 provides coarse synchronization), then further comprising:
comparing the sample energy pattern to a next portion of the expected energy pattern to a next portion of the expected energy pattern, the next portion of the expected energy pattern within the time uncertainty window (The process of Serial Acquisition is repeated until a candidate is found per Para 10.5.1.2 Pgs 565-568) ; and

determining whether the next time period is a coarse synchronization candidate as a function of the comparison between the sample energy pattern and the next portion of the expected energy pattern (The process of Serial Acquisition is repeated until a candidate is found per Para 10.5.1.2 Pgs 565-568).

Regarding **Claim 7,** and further comprising sequentially repeating, for the subsequent time periods within the time uncertainty window until a coarse synchronization candidate is found, the step of comparing the sample energy pattern to the next portion of the expected energy pattern, and the step of determining whether the next time period is a coarse synchronization candidate as a function of the comparison (The process of Serial Acquisition is repeated until a candidate is found per Para 10.5.1.2 Pgs 565-568) ;.

Regarding **Claim 8,** and after a coarse synchronization candidate (The Frequency Hopper output per Fig 10.20 per Pg 567 can be adjusted for both fine and coarse synchronization) is found further comprising;

Tuning the first receiver to second frequency out of the plurality of frequencies used in the data link network (The Tracker described per Pgs 568-570 provides input into the Frequency Hopper per Fig 10.20 Pg 567 to fine tune for a second frequency);

Observing signal strength of signals received on a second frequency during a second sample time period to obtain a second energy pattern (The Tracker described per Pgs 568-570 provides input into the Frequency Hopper per Fig 10.20 Pg 567 to fine tune for a second frequency as well as obtain a second energy pattern)

Determining a second expected energy pattern during a time period corresponding to the second sample time period, using the coarse synchronization candidate as a reference time, based upon the known hopping pattern (The Integrator integrates a time interval or uncertainty time window in which the output is Threshold tested per Fig 10.20 Pg 567)

Comparing the second energy pattern to the second sample time period (Comparator per Fig 10.20 Pg 567); and

Verifying the accuracy of the coarse synchronization candidate based upon the comparison between the second sample energy pattern and the expected energy pattern (Search Control per Fig 10.20 Pg 567)

Regarding **Claim 9,** and further comprising:

Tuning each of a plurality of other receivers to different ones of a plurality of other frequencies used in the data link network (Fig 10.17 Pg 564)

Observing signal strength of signals received on each of the plurality of other frequencies during the sample time period to obtain a plurality of other sample energy patterns (Fig 10.17 Pg 564)

Determining the plurality of other expected energy patterns corresponding to the time uncertainty window, each of the plurality of other expected energy patterns being based upon a know hopping pattern and upon a corresponding one of the plurality of other frequencies (Fig 10.17 Pg 564).

Comparing each of the plurality of other sample energy pattern to a first portion of the expected energy pattern, the first portion of the expected energy pattern corresponding to a first time period within the time uncertainty window (Fig 10.17 Pg 564))

Determining whether the first time period is a coarse synchronization candidate as a function of the comparisons (Fig 10.17 Pg 564)

Regarding **Claim 12,** wherein the first time period corresponds to a first plurality of time slots used in the data link network and which fall within the time uncertainty window (The Integrator per Fig 10.20 Pg 567 utilizes an integration time or uncertainty time window which is based upon search dwell time as well as probability of detection per Para 10.5.1.2 pgs 565-568. It is within the level of one skilled in the art to adjust parameters. The integrator time period can be adjusted based upon search dwell time as well as probability of detection per Para 10.5.1.2 pgs 565-568.)

Regarding **Claim 13,** wherein the sample period has a duration which is substantially equal to the first time period ("Substantially equal to the first time period" has a broad meaning. The Integrator per Fig 10.20 Pg 567 utilizes an integration time or uncertainty time window which is calculated based upon search dwell time as well as probability of detection per Para 10.5.1.2 pgs

565-568. It is within the level of one skilled in the art to adjust parameters. The integrator time period can be adjusted based upon search dwell time as well as probability of detection per Para 10.5.1.2 pgs 565-568.)

Sklar does not expressly call for: Determining an expected energy pattern but teaches Threshold testing.

It would be obvious to one of ordinary skill in the art at the time of the invention that the expected energy pattern was used in the calculations that determined the threshold of Sklar.

Referring to **Claim 10**, Sklar teaches: A radio for use in a frequency hopped/direct sequence spread spectrum (FH/DSS) time division multiple access (TDMA) data link network (I would be obvious that the receiver per Fig 10.20 Pg 567 be utilized as a radio because it is utilized for receiving spread spectrum), the radio comprising:

A first receiver adapted to be tuned to a first frequency out of a plurality of frequencies used in the data link network (Fig 10.20 per Pg 567 or first receiver tuned to a plurality of frequencies)

Signal strength determining circuitry adapted to observe signal strength of signals received on the first frequency during a sample time period (Integrator per Fig 10.20 Pg 567 or circuitry)

Processing circuitry coupled to the signal strength determining circuitry and adapted to determine a sample energy pattern in response to the observations by the signal strength determining circuitry (Fig 10.20 Pg 567 or processing circuitry),

The processing circuitry being further adapted to determine an expected energy pattern corresponding to a time uncertainty window (Integrator per Fig 10.20 Pg 567 or processing circuitry)

The expected energy pattern being based upon a known hopping pattern, the processing circuitry being adapted to compare the sample energy pattern to a first portion of the expected energy pattern (The Integrator integrates a time interval or uncertainty time window in which the output is Threshold tested per Fig 10.20 Pg 567 or processing circuitry)

The first portion of the expected energy pattern corresponding to a first time period within the time uncertainty window (Comparator per Fig 10.20 Pg 567)

The processing circuitry further being adapted to determine as function of the comparison whether the first time period is a coarse synchronization candidate (Search Control per Fig 10.20 Pg 567 or processing circuitry)

In Addition:

Regarding **Claim 11,** wherein the processing circuitry is further adapted to: obtain a received energy pattern by observing the signal strength of the signals received on the first frequency during the sample time period (Integrator per Fig 10.20 Pg 567 or processing circuitry. It would be obvious to one of ordinary skill in the art at the time of the invention calculation of the threshold takes into account signal strength for a given probability of detection)

Compare the received energy pattern to a threshold (Threshold per Fig 10.20 Pg 567) and

Determine the sample energy pattern by eliminating energy components from the received energy pattern which do not exceed the threshold ("eliminating energy components from the received energy pattern which do not exceed the threshold" has a broad meaning. If received signal which is threshold does not meet the threshold testing per Fig 10.20 Pg 567 then it is eliminated and the serial acquisition is repeated until a candidate is found per Para 10.5.1.2 per Pgs 565-568)

Regarding **Claim 14,** wherein if the first time period is determined to not to a synchronization candidate (If the Comparator determines that synchronization has not be found per Fig 10.20 per Pg 567)

then the processing circuitry is further adapted to compare the sample energy pattern to a next portion of the expected energy pattern (The processing circuitry of Fig 10.20 per Page 567 continues on a sequential search per Para 10.5.1.2 per Pgs 565-568),

the next portion of the expected energy pattern corresponding to a next time period within the time uncertainty window (The processing circuitry of Fig 10.20 per Page 567 continues on a sequential search per Para 10.5.1.2 per Pgs 565-568),,

and wherein the processing circuitry is adapted to determine whether the next time period is a coarse synchronization candidate as a function of the comparison between the sample energy as a function of the comparison between the sample energy pattern and the next portion of the expected energy pattern (The Comparator or processing circuitry determines that synchronization has not be found per Fig 10.20 per Pg 567)

Sklar does not expressly call for: Determining an expected energy pattern but teaches Threshold testing or processing circuitry.

It would be obvious to one of ordinary skill in the art at the time of the invention that the expected energy pattern was used in the calculations that determined the threshold which is in processing circuitry of Sklar shown in Fig 10.20 Pg 567.

Referring to **Claim 15**, Sklar teaches: An apparatus for obtaining coarse synchronization in a frequency hopped/direct sequence spread spectrum (FH/DSS) time division multiple access (TDMA) data link network (Fig 10.20 Pg 567 or apparatus), the apparatus comprising:

Means for tuning a first receiver to a first frequency out of a plurality of frequencies used in the data link network (Frequency Hopper per Fig 10.20 Pg 567 or means for tuning)

Means for observing signal strength of signals received on a first frequency during a sample time period to obtain a sample energy pattern (Integrator per Fig 10.20 Pg 567 or means for observing)

Means for determining an expected energy pattern corresponding to a time uncertainty window, the expected energy pattern being based upon a known hopping pattern (The Integrator integrates a time interval or uncertainty time window in which the output is Threshold tested per Fig 10.20 Pg 567 or means for determining)

Means for comparing the sample energy pattern to a first portion of the expected energy pattern, the first portion of the expected energy pattern corresponding to a first time period within the time uncertainty window (Comparator per Fig 10.20 Pg 567 or means for comparing)

Means for determining whether the first time period is a coarse synchronization candidate as a function of the comparison between the sample energy pattern and the first portion of the expected energy (Search Control per Fig 10.20 Pg 567 or means for determining)

Sklar does not expressly call for: Determining an expected energy pattern but teaches Threshold testing.

It would be obvious to one of ordinary skill in the art at the time of the invention that the expected energy pattern was used in the calculations that determined the threshold of Sklar.

Claim Objections

4.0 Claims 4-5 & 13 are objected to under 37 CFR 1.75 for being confusing.

Claims 4-5 and 13 use "substantially". "Substantially" has a broad meaning which is confusing as well as unclear and indefinite to the examiner.

Conclusion

5.0 The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Rasky et al., U.S. Patent No.: 5,428,647 dated 6/27/95 in which he discloses an apparatus which estimates the energy or signal strength and estimates the frequency as well per Figs 2-4.

Hogger, U.S. Patent No.: 6,490, 262 B1 dated 12/3/2002 in which he discloses an determining a pattern of identified bursts based base upon a predetermined sequence.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert W Wilson whose telephone number is (703) 305-4703. The examiner can normally be reached on M-F (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas Olms can be reached on (703) 305-4703. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Robert W. Wilson

Robert W Wilson
Examiner
Art Unit 2661

RWW
September 29, 2003

DANG TON
PRIMARY EXAMINER